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INITIAL BILLET ASSIGNMENTS
AND THE
PERFORMANCE OF NAVAL OFFICERS

by

La Toya Bellamy

December, 1991

Thesis Co-Advisors: Stephen L. Mehay
William R. Bowman

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This thesis attempts to determine if there is a relationship between initial ship type, initial billet assignment, the number of surface qualifications earned and career progress for surface warfare officers. The data used in this thesis were taken from the Officer Master-Loss Record File (maintained at the Department of Defense Manpower Data Center, Monterey, California) and the Officer Promotion History Data Files collected by the Department of Navy for all officers, both active and reserve duty. Information was examined on surface warfare officers whose records appeared before lieutenant commander selection boards, as extracted from both sets of files, on both those who stayed on active duty and those who left. The Officer Master-Loss Record File was derived for those officers who were commissioned between 1 January 1976 and 31 December 1982. The Officer Promotion History Data Files, (Background and Experience files), were archived beginning 1981 through 1986 for applicable surface warfare officers.

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INITIAL BILLET ASSIGNMENTS AND THE PERFORMANCE OF NAVAL OFFICERS

by
La Toya Bellamy
Lieutenant, United States Navy
B.S., Florida, A&M University, 1984

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Author: La Toya Bellamy
La Toya Bellamy

Approved by: Stephen L. Mehay
Stephen L. Mehay, Thesis Co-Advisor

William R. Bowman
William R. Bowman, Thesis Co-Advisor

David R. Whipple, Chairman
Department of Administrative Sciences

ABSTRACT

This thesis attempts to determine if there is a relationship between initial ship type, initial billet assignment, the number of surface qualifications earned and career progress for surface warfare officers. The data used in this thesis were taken from the Officer Master-Loss Record File maintained at the Defense Manpower Data Center (DMDC), Monterey, California, and the Officer Promotion History Data Files collected by the Department of Navy for all officers, both active and reserve duty. Information was examined for surface warfare officers whose records appeared before Lieutenant Commander selection boards as extracted from both sets of files, on both those who stayed on active duty and those who left. The Officer Master-Loss Record File was derived for those officers who were commissioned between 1 January 1976 and 31 December 1982. The Officer Promotion History Data Files (Background and Experience files) were archived beginning 1981 through 1986 for Lieutenants and from 1985 through 1990 for Lieutenant Commanders. The results indicate officers assigned to Amphibious ships (AMPHIBS) for their initial division officer tours are less likely to earn qualifications in comparison to those assigned to cruisers and destroyers (CRUDES). Officers serving initial tours on AMPHIBS are also more likely to be passed over at the LCDR selection board. Additionally Black officers are 2 to 6 percent more likely to be assigned to amphibious ships and 7 to 15 percent less likely to be assigned to CRUDES ships.

TABLE OF CONTENTS

LIST OF TABLES

I. INTRODUCTION

There are many factors that contribute to the retention and promotion of surface warfare officers (SWOs) in the U.S. Navy. This thesis seeks answers to several questions: (1) is the "different but equal" philosophy of the career paths accurate, or are there differences that exist in ship and billet assignments that virtually set the stage for an officer's performance?; (2) are these difference in assignments small or more significant than the Navy realizes?; and (3) which differences have the greatest impact on various surface warfare trainee subgroups?

Successful analysis of these factors begins with an understanding of a naval officer's initial assignment. Officers in the surface warfare community begin their careers at Surface Warfare Officers School (SWOS) in Newport, Rhode Island, or Coronado, California. This 16-week course is designed to provide the prospective SWO with the fundamentals of naval engineering, seamanship, navigation, surface ship administration, and naval warfare, and to prepare the officer for his initial sea tour as a division officer. Following SWOS, the SWO trainee (designated 1115 or 1165) commences a 30-month initial sea tour as a division officer. During the first 24 months on-board, the officer is required to complete SWO qualifications. This qualification process includes

demonstrating a knowledge of engineering, damage control, shipboard navigation, seamanship, combat information center (CIC) operations, communications, supply procedures, warfare fundamentals, division officer responsibilities, and final qualification as officer of the deck (OOD) underway. Completion of this first major milestone in the career of a surface line officer authorizes the SWO trainee to be fully designated a surface warfare officer (1110/1160) and to wear the surface warfare breast insignia. Also, during this initial sea tour, the ensign should be promoted to lieutenant (junior grade) after two years of commissioned service; and he should request and be selected to attend Surface Warfare Officer Department Head School. [Ref. 1]

The retention, promotion and major board selection of officers in the U.S. Navy are theoretically based on performance; however, tremendous effort by junior officers goes towards lobbying for the right billets and ship type. This effort stems in part from the belief that some billets in the surface warfare community provide a slower career track than do others. The perceived slower career tracks are often believed associated with platforms outside the surface warfare mainstream, such as troop carriers and replenishment ships. Other perceived contributors to slower career tracks are insignificant or "low visibility" billets, such as the boilers division officer or first lieutenant. These billets and certain ships types (older platforms and replenishment ships)

are avoided because of the perceived amount of divisional work required, which could detract from efforts to achieve surface warfare qualifications. If these beliefs are founded, a main contributor to continued service could, therefore, be the initial perceptions of junior officers concerning work conditions and the amount of mainstream exposure. The experience and training required to remain competitive in the surface warfare community should be equally available to all officers, or promotion becomes less a function of performance and more a function of assignment.

A. STATEMENT OF THE PROBLEM

The professional career patterns for SWO are designed to be different yet equal in terms of career opportunities, promotion opportunities, and opportunity for achievement of career goals within the respective warfare areas and on the separate platforms. Following designation as a SWO and 18 months of duty on-board the initial sea command, the officer may request a "split-tour" to another division officer tour on-board a different type of surface ship. This provides surface warfare qualified junior officers the opportunity for a variety of naval experiences and permits them to broaden their knowledge base for future assignments. However, split-tours are only approved for those who have earned their SWO qualification. Even when split-tours are approved, officers who are already aboard the desired ship type are often waiting

for the "good" billets. Officers coming from outside the command fall in line behind the ship's current wardroom. Most officers remain on the same platforms in varying divisions for almost three years, which causes some stagnation in their gaining valuable varied experience.

There may be significantly different career effects in serving on different platforms, and in different billets for junior SWOs. These differences could be demonstrated in the rates of retention, major board selection, promotion and number of qualifications earned by junior SWOs. If these differences exist, officers initially assigned to the more desirable billets might perform better and demonstrate a higher probability of completing a Navy career than those assigned to less desirable billets. Some billets are available only on certain ships and are simply not available to many junior officers. Considering these possible difference, are these billets filled through some selection process, or simply by availability? If there is a selection process, how is the process structured, and if it is by availability, which lobbyists are heard?

B. SCOPE AND FOCUS

This thesis will focus on the effect of the initial billet and ship type assignments on retention, major board selection, and promotability of junior officers in the surface warfare community. This paper will attempt to outline the different

flow patterns of newly commissioned officers from their first assignment to consecutive assignments or attrition. Although some statistics on demographics also are presented, they are used mainly as control variables; demographic factors are secondary to the main focus of this study on ship type, billet assignment, number of qualifications earned, and selection board performance.

One hypothesis to be examined suggests that some officers fall behind in training and experience as a result of initial ship type and billet assignment. Once they fall behind in their career goals, they either attrite voluntarily or are passed over. Also examined is the question of whether assignments to billets with less qualified or less motivated personnel and more demanding divisional work loads affect the progress and career path of SWOs by limiting exposure and delaying qualifications such as SWO, tactical action officer (TAO), officer of the Deck (OOD) and engineering officer of the watch (EOOW). Finally, this study outlines predictors of officer promotion and selection at critical boards related to first assignments.

C. REASON STUDY IS IMPORTANT

This study is of particular importance because in accordance with 1983 implementation of NAVOP 105, at the department head level a successful career path in today's fleet means that an officer will specialize in one particular

department (operations, combat systems, or engineering). Career options would, thus, become more a function of initial assignments than performance and ability. If certain billets are more advantageous than others, then career options could be established for some officers before they reach the fleet.

II. LITERATURE REVIEW

In the attempt to uncover any differences associated with billet and ship types that could be detrimental or beneficial during the initial assignment, a literature search was conducted on holdings at the Naval Postgraduate School Library, in Monterey, California. The first and most crucial difference among billets and ship types are the difficulties they pose for some officers' efforts to obtain SWO qualifications. The time required to earn this qualification is paramount to surface warfare trainees because it paves the way for continued progress in the community. As Cymrot and Kietus notes, a number of factors contribute to the rate of SWO qualification, which include ship and billet type. [Ref. 2]

Estabrooks reports the initial or subsequent ship and billet assignments are by no means guaranteed to surface warfare hopefuls. Estabrooks also states that the assignments of SWO graduates are the result of surface detailers attempting to fill fleet billet requirements, and not just the desires of the officers. As officers progress in rank, their desires are more often incorporated into future assignments; but the final results remain closely related to the fleet billet requirements. Additionally, Estabrooks reviews a study by Derr and Holzbach that provides evidence that a statistical

relationship exists between assignments and retention. [Ref. 3]

Each community in the Navy has a hierarchy of career-enhancing billets which play key roles in promotion and retention. Performing well in so-called "good billets" is more significant to the ranking of officers on fitness reports (FITREPS) than performing well in other billets. Career-enhancing billets continue to widen in their importance over other billets when an officer seeks his next assignment by expanding the officer's potential. Detailers place officers in consecutive career-enhancing billets based on officers having been previously assigned (and performed well) in other career enhancing billets. [Ref. 4]

Lieutenant Commander John Brown calls attention to the importance of battle group concepts and how they assist unrestricted line officers in preparing for roles of greater responsibility and importance. [Ref. 5] He points out that officers who do not receive integrated training throughout their careers will be unable to assume battle group level billets, which require multi-platform operations. His work clearly calls for SWOs to be familiar with all facets of battle group tactics, which surely cannot be obtained from some platforms such as oilers (AOs) or tank landing ships (LSTs). The following quote defines the relationship between battle group and integrated tactics:

> Battle group tactics are defined as those coordinated tactics which are employed in a battle group environment against a multi-faceted threat. Integrated tactics involve tactical naval warfare which is characterized by multiple, dissimilar platforms operating as a single tactical unit. Integrated tactics are considered battle group level tactics and are referred to alternatively as composite warfare tactics. [Ref. 5]

Clearly, steaming with the battle group should improve one's experiences, ability to hold higher positions in the battle group and, thus, the chances of being promoted. Weber describes the promotion process as being short and restricted to a precise number of officers in each grade per year. [Ref. 6] Officers are selected for promotion in one of three separate categories: "below zone," which means an officer more junior than the normal promotion zone cut-off; "in zone," which implies an officer has the seniority and has not previously been considered; and "above zone," meaning the officer has been in the promotion zone previously and failed selection.

A. SHIP TYPES

Officers are allocated to specific surface warfare communities based upon their first sea-going duty station after completion of the SWO basic school. This tour is identified using the naval officer billet code (NOBC) station code on the Officer Master File (OMF). The station code is an alpha numeric code that specifies the type of ship or shore station for each NOBC assignment. [Ref. 7] Although duties

and responsibilities of division officers are basically the same aboard most naval ships, there are substantial differences among ships types that facilitate or hamper trainees' efforts to earn SWO qualifications, such as the amount of battle group steaming and ship armament. The following quote describes the three main SWO communities:

> The SWO community can be divided into three main communities: cruiser-destroyer (CRUDES), amphibious (AMPHIB), and combat logistics force (CLF). In addition, SWOs serve on other ships such as aircraft carriers, minesweepers, auxiliary ships, etc. (VARIOUS). [Ref. 7]

The peculiarities of the individual SWO communities are significant because each provides a different level of exposure to mainstream surface warfare training. This training is heavily molded by surface war fighting drills conducted during battle group steaming or individual operations using the ship's weapons.

The CRUDES platforms provide the atmosphere most conducive to SWO training. These ships spend the most time underway and, thus, afford a junior officer the best opportunities for training. These ships have the widest array of weapons and associated equipment, the greatest concentration of qualified SWO officers, and provide the best opportunity for trainees to earn qualifications.

Besides permitting fewer opportunities to qualify, some ships simply offer harsher working conditions than others. A study of junior officer retention sponsored by the Office of Naval Research, Organizational Effectiveness Research Program,

indicates that bad working conditions are frequent issues associated with poor retention. [Ref. 8]

The amphibious community represents the greatest capacity for dissatisfaction by junior officers, which is due to the platform types. Since most of these ships have hulls designed to facilitate amphibious operations or flat bottoms, the time spent underway is often more than challenging as these ships roll and pitch heavily, which greatly contributes to physical discomfort. The AMPHIBs are only lightly armed, spend a relatively small amount of time underway in battle group formations, and by far represent the poorest opportunity to obtain a surface warfare qualification. The ship's configuration limits battle group steaming and, therefore, limits surface warfare training and severely hampers junior officer SWO qualifications.

Ensigns assigned to aircraft carriers also face great adversity in attaining surface warfare qualification; however, because of cross-deck training opportunities with ships in the battle group, their situation is not as extreme as officers assigned to AMPHIBs. Since there is a large variety of officers vying for limited training and exposure opportunities to mainstream surface warfare operations first tours served on these ships can be difficult at best. Most combat logistics force ships also have little or no armament, but log many hours steaming with the battle group. They represent a

crossroads between the best and worst setting for obtaining surface warfare qualifications.

B. BILLETS

The factors that make one billet more desirable than another are workloads, quality of assigned personnel, and exposure to the senior officers and the commanding officer. The workloads are a combination of divisional duties, standing watch, filling out various reports, counseling assigned sailors, and working on SWO/PQS qualifications. Some billets are available only on certain platforms.

As observed, the worst jobs are first lieutenant, damage control assistant (DCA), boilers division, and auxiliary division (A-gang) aboard steam powered ships. The division officer's responsibilities are more taxing in the aforementioned divisions because of harsh working conditions consisting of high temperatures in work spaces, numerous daily reports, and a large variety of equipment. These divisions also frequently have numerous sailors who have been released from other divisions and from the nuclear power program for discipline or performance problems.

If an officer has a special evolution station, such as the first lieutenant on the main deck, the chances to pilot the ship for experience and qualifications are sever ly reduced. Another example of a billet hampering SWO qualifications is an engineering officer standing watch below decks while the ship

conducts major evolutions above deck, such as missiles and torpedoes. The following quote describes some of the challenges facing SWOs:

> Historically, our surface officers have been "jacks of all trades," focusing on all areas of shipboard readiness in preparation for command-at-sea. The challenge for these officers has been in keeping pace with talented specialists and rapidly changing complex systems, thus calling for more technical knowledge among our midgrade officers. The ability of the "well rounded" officer to acquire the technical proficiency required to successfully manage a specific (i.e., operations, combat systems, engineering) field has become questionable. [Ref. 8]

In addition to the question of whether midgrade officers can earn the technical proficiency (surface qualifications) if the fleet turns towards specialization, is also the question of balance. If the perceived difference in billets does exist, how far will the gap widen between those in the technical fields and those who are not such as steam engineers? The Navy must examine this question in order to maintain an adequate numbers of officers and or even distribution across all fields. If new career advantages will result from specialization in certain careers difficulties in maintaining and recruiting officers for other billets will suffer.

III. METHODOLOGY

A. OVERVIEW

This chapter describes the data sources and the coding and the programming techniques utilized to derive the variables employed in the study. The various constraints and limitations of the data analysis are also discussed.

B. DATA

The first data set used in this study is extracted from the Officer Master-Loss Record File (maintained at Defense Manpower Data Center, Monterey, California), and created for the purpose of determining the reason for separation for those officers who separated. The second set of data used for this study is provided by William R. Bowman, Ph.D., Department of Economics, United States Naval Academy. The data are taken from the Officer Promotion History Data Files, collected by the Department of Navy for all officers, on both active and reserve duty, for grades O-3 (lieutenant) through O-7 (rear admiral, lower half), and are archived beginning in FY 1981 through FY 1990. These files are built specifically for the purpose of analyzing Navy officer retention and promotion patterns.

The Officer Promotion History Data files contain two different sets of files: (1) Navy Officer Background Data

files, and (2) Navy Officer Experience Data files, which are both used for this study. The background files contain elements describing pre-commissioning information on each officer including demographic, schooling, and prior service factors, along with basic officer selection board results. These files are each made up of six individual files, and cover years 1981 through 1986 for lieutenants, and 1985 through 1990 for lieutenant commanders. The experience files contain Navy experience factors including service schools, billet codes, duty stations, and additional qualification designators existing up through the time an officer is considered for promotion to the next higher grade. The individual files that make up the experience files cover the same years as the background files. This thesis focuses solely on the SWO. The complete procedure used to derive the specific final files of stayers and leavers is presented in Appendix A.

In developing the final files, two important aspects are leavers (voluntary/involuntary) and SWO transfers (in/out). The leaver file contains two types of leavers and is separated based on reasons for separation. The SWOs who are forced out of the naval service for drugs, poor performance, disability, etc., constitute involuntary separation; those who transfer to other communities or have personal hardships constitute voluntary leavers. The voluntary leavers are isolated from involuntary leavers using the separation code variables and

NAVMILPERSCOMINST 1900.1B, Codes for Separation. The separation codes which are used and their descriptions and frequencies are presented in Appendix B.

Transfers also represent a part of the next important issue in developing the final files for analysis. Some SWO move in or out of the SWO community after promotion to lieutenant. Many officers who transfer go to Engineering Duty Officer (EDO) and Medical Staff Corps (MSC) communities. Those who transfer in often come from aviation warfare or nuclear power. The officers who transfer to different communities are included with "STAYERS" as they did no voluntarily leave the Navy. In theory, the officers who transfer into the surface community will demonstrate different performance patterns because of different career paths, and could bias the results. Therefore, those officers who transfer into the SWO community after making lieutenant are not considered in the study.

The final files created are the leavers experience (LVREXP), containing 3,290 records, and stayers experience (STAYEXP), containing 6,157 records. These files represent the main data files which are used in this thesis, and a visual representation of the creation process used to create both files is illustrated in Chart 1 of Appendix A.

The variable layouts of the background, experience and loss files (used to create both LVREXP and STAYEXP) are also presented in Appendix B.

The SWO leavers (LVREXP) and the SWO stayers (STAYEXP) are then separated into lieutenant and lieutenant commander files. Next, they are filtered to delete women and nuclear SWOs, and analyzed to provide specific demographics and pertinent factors of the officers in both files.

C. VARIABLE EXPLANATION

1. Category (Ship Type)

In theory, ship type is one of the most important variables with respect to obtaining surface warfare qualifications as discussed in Chapter II. Using the first three character positions of the initial duty station variable, the CATEGORY of ship type dummy variables are created. The ship type dummy variables are defined as follows:

(1) CRUDES -- battleships (BB), cruisers (CG/CGN), destroyers (DD/DDG) and frigates (FF/FFG).

(2) AMPHIB -- all amphibious ships: (LCC/LHA/LHD/LKA/LPD/LPH/LSD/LST).

(3) VARIOUS -- All ships not included in CRUDES or AMPHIB: patrol combatants (PHM/PBC), mine warfare (MCM/MSO/MHC) and auxiliary ships (AGF/AGSS/AE/AFS/AD/AO/AOE/AOR/AR/ARL/-ARS/AS/ASR/ATS/AVT/ATF), strategic sealift (TAC/TACS/TAE/TAF/TAFS/TAG/TAGOS/TAH/-TAK/TAKB/TAKF/TAKR/TAO/TAOT/TAP/TAR/

TAFS/TATF/TAV/TAVB/TAH), aircraft carriers (CV/CVN).

(4) SHORE -- All initial billets which are not ships.

In addition to the variables described in th appendices, several dummy variables are created to further isolate behavior characteristics. AMPHIB represents all troop carriers and other ships designed solely for the purpose of supporting Marines. These ships perform limited battle group steaming, have few weapons, and afford officers little exposure to mainstream surface warfare training. The CRUDES variable includes all battle group combatants, and is theorized as having the greatest, positive impact on the number of surface qualifications earned, on lieutenant commander selection board performance and on retention. The VARIOUS category includes all ships which are not in the AMPHIB or CRUDES variables, and represent mostly poor input to the three variables this thesis attempts to model. Although aircraft carriers (CV/CVN) are combatants with continuous battle group steaming, they could easily have been grouped with the VARIOUS variable because they represent a wide variety of opportunities and experience. It is very difficult to qualify the training and exposure recieved on these ships and this represents a limitation of this study.

2. Billet (HIOPP/LOWOPP)

This variable describes the initial job assignment and is created using the earliest Navy officer billet code to appear in the officers record. All engineering division officer billets (boilers, main machinery, damage control assistant, auxiliaries and the main propulsion assistant) and the first lieutenant (weapons division), are grouped into the LOWOPP category. The discussion above suggests that these billets do not provide the same exposure to surface warfare exercises, and represent lesser opportunities to gain additional qualification designators (AQDs). The HIOPP variable represents the remaining billets available to surface warfare trainees during the initial tour. This variable is hypothesized to have a positive impact on all dependent variables.

3. Qualifications (QUALS)

The total number of AQDs are combined to create the dummy variable, QUALS. The number represents those surface warfare qualifications obtained and archived up to the time the officer appeared before the selection board. Some examples of these surface qualifications are, tactical action officer (TAO), officer of the Deck (OOD) and engineering officer of the watch (EOOW).

4. Undergraduate Major (MAJOR)

The UGMAJ variable described in Appendix B is recoded to represent the effect of two prinicapl undergraduate majors: technical major and nontechnical majors. The resulting dichotomous variable is defined as follows:

If UGMAJ=1,2 OR 3 then MAJOR=1.

If UGMAJ=4,5,6 OR 7 then MAJOR=0.

5. Years Required To Gain SWO Qualification (SWOTIME)

The variable SWOTIME is defined as the difference between the year when surface warfare qualification (SWO) is obtained and the commissioning year. This variable is created but not used because of inconsistencies in the data. This represents a major limitation in the thesis.

6. Years In Service (YIS)

The YIS variable represents the total years of commissioned naval service for each officer in the data file. To create YIS, the commissioning year is subtracted from the last year that files are archived (1990 for lieutenant commanders and 1986 for lieutenants). Again the dates are inconsistent and the variable is discarded.

7. Source (SOURCE)

The source variable, described in Appendix C, reflects the commissioning source and is coded as follows:

SOURCE1=USNA

SOURCE2=ROTC

SOURCE3=NESEP

SOURCE4=OCS

8. Total Crudes (TLCRUDES)

TLCRUDES is the total number of CRUDES ships that an officer is assigned to at the time of the Lieutenant Commander selection board.

IV. ANALYSIS

A. INTRODUCTION

This thesis is developed around one general and two specific questions. The general question is: "Do certain initial billets and ship types provide advantages for some SWOs and disadvantages for others?" The specific questions are:

- What is the impact of billet and ship type on the number of surface qualifications obtained?
- What impact does the number of qualifications have on performance at lieutenant commander selection boards?

In addition to the variables previously described, several other variables are examined for potential explanatory capabilities but later deleted for various reasons. Among these are the variables representing time to earn the surface warfare qualification (SWOTIME), years in service (YIS) and undergraduate major (MAJOR). Both SWOTIME and YIS are dropped because of inconsistencies or numerous missing observations. Time to initial SWO qualification is key to quantifying the advantages of early SWO designation with regard to ship type or billet type. Examining years in service would permit further discernment of the effects of naval experience on obtaining ADQs. The MAJOR variable is excluded from the study because of strong correlation with the

GPA and the MQC variables described earlier. The inconsistencies in these variables (YIS and SWOTIME) hamper attempts at complete model specification; but, the regression models confirm a priori expectations regarding basic correlation patterns. Logistic regression models are estimated to investigate cause and effect. Further inter-relationships are define with correlation tables among independent variables. The methodology of the various regression models and this process is displayed in Figure 1.

The process of obtaining officer qualifications and of being selected for LCDR is modeled independently, as shown in figure 1 below.

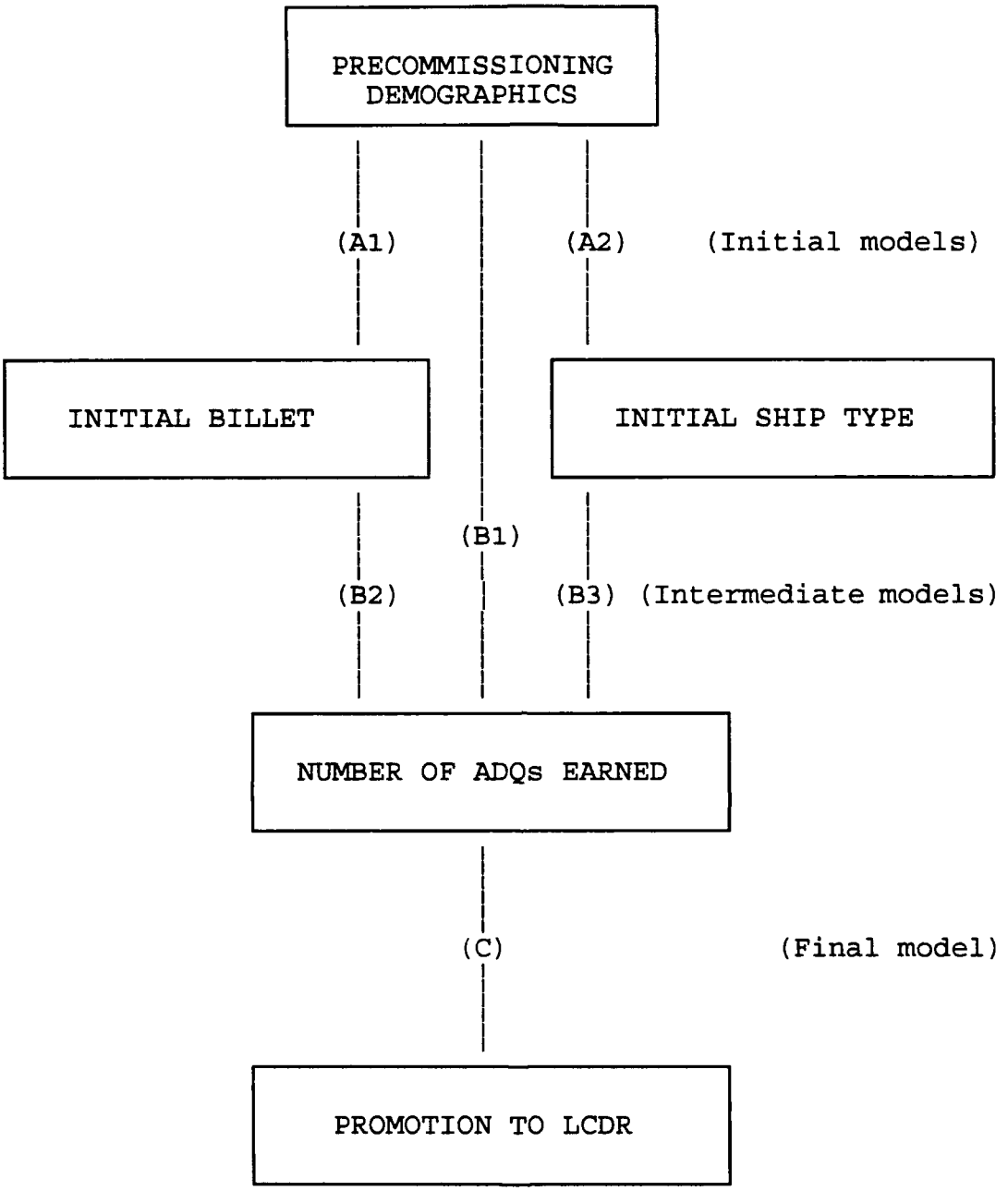

Figure 1.--Hypothesized Relationships of the Model's Three Dependent Variables

The initial phase of the analysis estimates the effects of precommissioning factors on the initial billet assignment (line A1) and also initial ship type assignments (line A2). In the intermediate phase, the impact of precommissioning factors are estimated for ADQs (line B1). This phase continues by estimating the effects of initial billet and ship type assignments on earning ADQs. In the final phase, the effects of precommissioning variables, initial billet, initial ship type, and number of ADQs earned on the SWOs promotion probabilities are modeled (line C).

A. INITIAL ASSIGNMENT MODELS

(1) BILLETS

Other aspects affecting eventual promotion and retention are follow-on assignments, operating schedule of the initial ships assigned, concentration of mid-grade SWOs at the command, the officer's initial preferences, billet requirements of the Navy during the officer's initial billeting, commanding officer's background (SWO or aviator), to name a few. For this reason, this thesis first focuses on correlation and then attempts to model cause and effect. Are some billets more correlated with promotion opportunities in the surface community than others? The earlier definitions of high opportunity and low opportunity billets are debatable,

but suffice as a defensible point of departure for the analysis based on theory and experience.

To examine if precommissioning factors affect initial billet assignment, a maximum likelihood logit model is estimated using the dependent variable HIOPP to represent the "best" initial billets. Table 1 contains the results of a logit estimation of initial assignment to HIOPP billets. Displayed are results with HIOPP as the dependent variable or precommissioning factors as explanatory variables.

TABLE 1.--INITIAL BILLET ASSIGNMENT MODEL

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: **HIOPP**

1691 OBSERVATIONS
195 HIOPP = 0
1496 HIOPP = 1

CONVERGENCE IN 5 ITERATIONS WITH 0 STEP HALVINGS R= 0.057.
MODEL CHI-SQUARE= 15.95 WITH 6 D.F. (-2 LOG L.R.) P=0.0146.

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P VALUE
GPA	.0865	.0897	0.93	.33
USNA	-.2865	.2214	1.68	.19
ROTC	-.1422	.2193	0.42	.51
NESEP	.2258	.3779	0.36	.55
BLACK*	-.7308	.2530	8.34	.00
MQC*	.1009	.0646	2.44	.11

Model Indicators:

- R has a value between 0 and 1, with 1 being a model that predicts perfectly.
- The chi-square statistic along with the p-value tests the joint significance of all variables in the model.

While most of the estimated coefficients' signs are consistent with a priori expectations, few of the variables are statiscally significant. The signs, however, suggest a weak positive relationship between higher undergraduate grade point averages and/or math qualifications and better initial assignments. The BLACK variable represents a strong and negative impact and suggests that Blacks are less likely to be

assigned to HIOPP billets compared to Whites, after controlling for an officer's undergraduate training.

The Pearson correlation coefficients are consistent with the results of the logit model. Furthermore as seen in table 2, a significantly negative correlation (-.12) between MQC and the BLACK variable, and a consistently negative correlation between GPA and BLACK suggests Blacks may be less likely to have high grade point averages and may partly explain part why Blacks are not assigned to HIOPP as often as Whites. As shown in Table 2, GPA and MQC are positively correlated with initial billet assignments.

TABLE 2.--HIOPP MODEL CORRELATION TABLE

VARIABLE	HIOPP	GPA	USNA	ROTC	NESEP	BLACK	MQC
HIOPP	1.0						
GPA	.04	1.0					
USNA	-.02	-.03	1.0				
ROTC	.01	-.01	-.33	1.0			
NESEP	.03	-.01	-.17	-.16	1.0		
BLACK	-.08	-.12	.04	-.01	-.03	1.0	
MQC	.03	.12	.32	.17	.22	-.02	1.0

In an attempt to further examine the long-run distributions of consecutive HIOPP assignments and race, basic correlation analyses are run and tested for homogeneity or

independence. As seen in Table 3 all categories demonstrate a similar distribution over the total number of good billets but minorities still lag behind Whites over all.

TABLE 3.--DISTRIBUTION OF CONSECUTIVE GOOD BILLETS BY RACE (IN PERCENT)

TOTAL GOOD BL	BLACK	OTHER	WHITE
0	0.0%	0.0%	0.3%
1	3.6%	5.4%	2.3%
2	7.3%	5.4%	6.6%
3	16.4%	24.3%	17.4%
4	30.9%	37.8%	31.8%
5	30.0%	18.9%	27.1%
6	9.1%	8.1%	10.6%
7	2.7%	0.0%	3.8%

STATISTICS FOR TABLE OF TOTAL GOOD BILLETS BY XRACE

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	14	8.979	0.832

For example while 14.4 percent of Whites achieve a total of six or more good billets before the LCDR selection board, only 11.8 percent (Blacks) and 8.1 percent (Others) of minorities are able to achieve this number of good billets. The chi-square statistic represents the level of significance of joint association between total "good" jobs and race, but is not significant. This finding is somewhat dubious since

the analysis does not control for time in service or other factors which may vary across the race variable.

(2) SHIP TYPE

Initial ship type assignments represent another aspect in the complex formula for the eventual promotion potential or success of a naval officer. Table 4 shows the logit model results with CRUDES as the dependent variable and again only precommissioning explanatory variables specified.

TABLE 4.--INITIAL SHIP TYPE MODEL

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: **CRUDES**

1691 OBSERVATIONS
688 CRUDES = 0
1003 CRUDES = 1

CONVERGENCE IN 5 ITERATIONS WITH 0 STEP HALVINGS R= 0.166.
MODEL CHI-SQUARE= 74.90 WITH 6 D.F. (-2 LOG L.R.) P=0.0.

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P VALUE
GPA*	.4107	.0613	44.81	.00
USNA	.0338	.1490	0.05	.82
ROTC*	-.3569	.1276	6.25	.04
NESEP*	-.5529	.2145	6.60	.01
BLACK	-.1497	.2052	0.53	.46
MQC*	.1146	.0432	7.04	.01

The results of the CRUDES model indicate ROTC and NESEP graduates are less likely to be assigned to CRUDES ships. Similar to the performance in the initial HIOPP assignments model, the MQC is significant and positively correlated with CRUDES. The predictions demonstrated by this model are consistent with a priori expectations once again and significant with the exception of the Black variable. The sign of the coefficient of black is negative but not significant. This may be due to the high correlation of BLACK with GPA, or other variable (such as officer preference), which are not available in this study. Pearson correlation coefficients in Table 5 show the high correlation between BLACK and GPA (-.12).

TABLE 5.--SHIP TYPE CORRELATION TABLE

VARIABLE	CRUDES	GPA	USNA	ROTC	NESEP	BLACK	AGE	MQC
CRUDES	1.0							
GPA	.17	1.0						
USNA	.05	-.03	1.0					
ROTC	-.04	-.01	-.33	1.0				
NESEP	-.04	-.01	-.17	-.16	1.0			
BLACK	-.03	-.12	.04	-.01	-.03	1.0		
AGE	-.03	.02	-.33	-.32	.38	-.02	1.0	
MQC	.07	.12	.32	.17	.22	-.02	-.27	1.0

In addition, a significantly strong and positive correlation (.38) is shown between MQC and NESEP possibly representing numerous officers in the engineering limited duty officer billets where additional math is require.

TABLE 6.--INITIAL SHIP ASSIGNMENTS BY RACE

RACE	AMPHIB	CRUDES	VARIOUS	SHORE
BLACK	19.1%	51.7%	20.9%	8.2%
OTHER	21.6%	64.9%	10.8%	2.7%
WHITE	17.1%	59.6%	20.1%	3.0%

STATISTICS FOR TABLE OF RACE BY CAT

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	6	9.942	0.127

Table 6 shows the correlation between race and the initial ship assignment using cross tabulation analysis. In this analysis of the officers who stayed in the Navy, 21.6 percent of all officers in the OTHER category are assigned to AMPHIB's as opposed to 19.1 percent and 17.1 percent for Blacks and Whites respectively. As will be shown in later analyses, CRUDES platforms demonstrate the greatest capacity for earning numerous qualifications, which, in turn, affect promotion. The results above show Blacks are assigned to CRUDES platforms 7.9 percent and 13.2 percent less often than Whites and Others respectively. The percentage differences of initial billet assignments are substantial between the races but, the chi-

square values reflect a weak relationship with a probability of only .12. Almost 60 percent of Blacks in the leaver file are assigned to CRUDES versus 73.3 percent and 70.6 percent for OTHER and Whites, respectively. Blacks are assigned to shore billets at more than triple the rate of Whites, and more than twice the rate of OTHER in the leaver file (not shown).

The total number of assignments to CRUDES platforms is also cross tabulated with race and the results are presented below in Table 7.

TABLE 7.--TOTAL CRUDES BILLETS BY RACE

RACE	ZERO	ONE	TWO	THREE	FOUR
BLACK	18.2%	37.3%	34.5%	10.0%	0.0%
OTHER	16.2%	29.7%	29.7%	24.3%	0.0%
WHITE	8.9%	34.1%	41.9%	13.4%	1.6%

STATISTICS FOR TABLE OF XRACE BY CAT

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	8	20.479	0.009

The results show high percentage advantages for Whites for all numbers of sequential assignments to CRUDES ships. One key figure shown in Table 7 is the nearly 18.2 percent of Blacks with zero assignments as compared to 8.9 percent for Whites. The analysis suggest that many Blacks, like White officers, may eventually be assigned to multiple CRUDES ship assignments. The sole difference, however, is for those Black

officers who are not assigned to a CRUDES ship initially and, for an unspecified period of time are never assigned to four CRUDES ships.

B. INTERMEDIATE MODELS: ADDITIONAL QUALIFICATIONS

A second set of logit models are specified and estimated using precomissioning and Navy experience variables to analyze the number of qualifications earned prior to the LCDR selection board. The results are shown in Table 8.

TABLE 8.--ADQs MODEL WITH PRECOMISSIONING VARIABLES

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: **QUALIFICATIONS**

1605 OBSERVATIONS
264 QUALS = 1
416 QUALS = 2
413 QUALS = 3
273 QUALS = 4
122 QUALS = 5
81 QUALS = 6
36 QUALS = 7

CONVERGENCE IN 5 ITERATIONS WITH 0 STEP HALVINGS R= 0.099.
MODEL CHI-SQUARE= 66.20 WITH 6 D.F. (-2 LOG L.R.) P=0.0.

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P VALUE
GPA*	.1876	.0510	13.50	.00
USNA	.2566	.1298	3.91	.04
NESEP*	-.9039	.1929	21.96	.00
BLACK*	-.3875	.1843	4.42	.03
MQC*	.0541	.0375	2.08	.14
ROTC	-.2000	.1278	2.45	.11

Once again, better grades are related to better fleet experience; that is GPA is significantly and positively related to greater numbers of additional ADQs. Graduating from USNA is also positively associated with ADQs compare to OCS grads, while ROTC grads obtain fewer ADQs. The negative relationship shown for the NESEP variable is expected as many of these officer are specialists who rise from the enlisted ranks and become limited duty officers. A large number of LDOs often go ashore after qualifying in this area or perceive no

future career advantages from earning additional qualifications outside of their specialty area as they near retirement. Table 9 again displays a logit estimation of the number of ADQs with Navy experience variables added to precomissioning variables.

TABLE 9.--ADQs MODELED WITH PRECOMISSIONING AND NAVY EXPERIENCE VARIABLES:

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: **QUALIFICATIONS**

1605 OBSERVATIONS
264 QUALS = 1
416 QUALS = 2
413 QUALS = 3
273 QUALS = 4
123 QUALS = 5
81 QUALS = 6
36 QUALS = 7

CONVERGENCE IN 5 ITERATIONS WITH 0 STEP HALVINGS R= 0.162.
MODEL CHI-SQUARE= 165.05 WITH 10 D.F. (-2 LOG L.R.) P=0.0.

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P-VALUE
GPA*	.1701	.0522	10.59	.00
USNA	.2219	.1308	2.88	.08
NESEP*	-.8295	.1941	18.25	.00
BLACK	-.2417	.1843	1.72	.18
MQC	.0624	.0379	2.70	.10
LOWOPP*	-.2664	.1412	3.56	.05
AMPHIB	.0068	.1350	0.00	.95
VARIOUS	.1810	.1242	2.12	.14
TLCRUDES*	.5227	.0589	78.62	.00
ROTC*	-.2128	.1291	2.72	.09

Coefficients on the precomissioning variables are little, if any, affected by the addition of Navy ship experience variables. The exception to this finding is the race variable, BLACK. In this expanded logit model specification, the coefficient on BLACK remains negative but is no longer significant. Further insight into this outcome is given in Table 10. Here it is evident that there exists a negative correlation between BLACK and CRUDES ships (-.06) and a positive correlation (.07) between BLACK and LOWOPP. These findings suggest that the reason the BLACK coefficient is not significant in the logit model is due to multicollinearity of other Navy experience variables.

A set of three two-way cross tabulations are presented below, relating billets and ship types to qualifications, along with race to qualifications.

TABLE 10.--PEARSON CORRELATION COEFFICIENTS: DEPENDENT VARIABLE, QUALS

	QUALS	GPA	USNA	NESEP	BLACK	MAJOR	MQC	TQC	LOWOPP	AMPHIB	VARIOUS	TLCRUDES	ROTC
QUALS	1.0												
GPA	.10	1.0											
USNA	.10	-.03	1.0										
NESEP	-.11	-.01	-.17	1.0									
BLACK	-.06	-.12	.04	-.02	1.0								
MAJOR	-.04	-.01	.11	.27	-.01	1.0							
MQC	.03	.11	.33	.22	-.02	.53	1.0						
TQC	.01	.17	.27	.30	-.04	.62	.61	1.0					
LOWOPP	-.04	-.04	.03	-.03	.07	-.02	-.04	-.01	1.0				
AMPHIB	-.10	-.17	-.03	.05	-.01	-.02	-.06	-.07	.04	1.0			
VARIOUS	-.03	-.06	-.01	-.01	-.01	-.01	-.03	-.01	.02	-.22	1.0		
TLCRUDES	.25	.06	.02	-.07	-.06	-.05	-.01	-.04	-.02	-.32	-.24	1.0	
ROTC	-.03	-.01	-.33	-.16	-.01	.12	.17	.14	-.01	-.01	.05	-.01	1.0

A further analysis of why black officers are less likely to obtain more ADQs is suggested by the cross tabulation of ADQs and billet type in Table 11.

TABLE 11.--ADQs BY BILLET TYPE

No. of Quals	HIOPP	LOWOPP
1	14.5%	24.0%
2	24.5%	24.5%
3	24.9%	22.5%
4	16.9%	10.8%
5	7.0%	9.3%
6	4.8%	3.9%
7	2.0%	2.0%

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	7	17.841	0.013

Table 11 is used to test for the joint association of HIOPP/LOWOPP and the number of ADQs. The results show the level of correlation between the two variables is significant at the .01 level for the displayed percentages. High opportunity billets demonstrate a small, but consistently better, impact on an officer's ability to earn qualifications with the exceptions of one and five ADQs. The percentages of officers in the HIOPP billets with only one qualification is expected to be lower than those of the LOWOPP billets.

Table 12 shows the relationship between initial ship type and the number ADQs earned.

TABLE 12.--ADQs BY SHIP TYPE

No. of Quals	AMPHIB	CRUDES	VARIOUS	SHORE
1	21.9%	12.8%	17.5%	22.0%
2	29.4%	23.4%	23.7%	23.7%
3	19.9%	26.3%	23.7%	25.4%
4	13.1%	18.3%	13.8%	8.5%
5	6.2%	7.1%	8.5%	8.5%
6	1.6%	5.6%	4.8%	5.1%
7	2.3%	2.4%	0.6%	3.4%

STATISTICS FOR TABLE OF QUALS BY CAT

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	21	54.935	0.000

Higher percentages of ADQs are earned in the CRUDES category in comparison to the remaining ship type categories as the number of qualifications increases. Likewise, the other three categories consistently show progressively higher percentages as the number of qualifications decreases. The number of qualifications earned according to initial ship type are strongly and significantly correlated and as reflected in the high chi-square and probability values.

Finally, Table 13 shows the number of qualifications earned with regards to race among those officers who remain on active duty.

TABLE 13.--ADQs BY RACE

No. of Quals	BLACK	OTHER	WHITE
1	19.1%	21.6%	15.2%
2	31.8%	18.9%	24.1%
3	20.0%	29.7%	24.8%
4	14.5%	18.9%	16.2%
5	8.1%	2.7%	7.3%
6	0.0%	0.0%	5.1%
7	0.0%	0.0%	2.2%

STATISTICS FOR TABLE OF QUALS BY XRACE

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	14	29.754	0.008

The results again clearly demonstrate that Blacks earn fewer qualification than Whites. Over one-half of Blacks earn two or less ADQs compared to roughly forty percent of white officers, while 8.1 percent of Blacks have five or more ADQs as compared to nearly 15 percent of White officers.

In summary, Black officers are shown to achieve fewer ADQs than Whites which is significantly related to their being assigned to lower opportunity billets initially and fewer assignments to CRUDES ships during their career prior to LCDR selection boards. The strong relationships between billets, ship types and ADQs earned masks the statistical significance of race and ADQs of the earlier logit model.

C. PROMOTION BOARD PERFORMANCE MODELS

The selection board performance models represent the final test of the earlier hypothesized relationships and attempt to provide concrete answers to promotion impacts of initial billets and ship types. The results of models estimated with precomissioning variables only, and then with billet and ship types are presented in Tables 14 and 15 below.

TABLE 14.--PROMOTION BOARD PERFORMANCE MODEL WITH PRECOMISSIONING VARIABLES

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: **PROMOTION BOARD PERFORMANCE**

1605 OBSERVATIONS
302 BPERF = 0
1303 BPERF = 1

CONVERGENCE IN 5 ITERATIONS WITH 0 STEP HALVINGS R= 0.121.
MODEL CHI-SQUARE= 34.75 WITH 6 D.F. (-2 LOG L.R.) P=0.0.

VARIABLE	BETA	STD. ERROR	CHI SQUARE	P VALUE
GPA*	.2997	.0776	14.90	.00
USNA*	.3328	.1964	2.87	.09
NESEP	-.2805	.2643	1.13	.28
BLACK	-.2890	.2455	1.39	.23
MQC*	.1116	.0544	4.20	.04
ROTC	.0458	.1840	0.06	.80

As with all previous models GPA remains positive and significant in both models. In addition, the math correlation variable is positive and significantly related to LCDR selection. USNA, relative to OCS, is positively related to

LCDR selection, but becomes insignificant when initial billets and ship types are included in Table 15. No significant difference in LCDR selection is found between OCS and ROTC, however.

Table 15 results show that low opportunity initial billets are negatively related to LCDR selection, but the coefficient is not statistically significant. Additional time at sea, relative to shore duty, is positively related to LCDR selection and is statistical significant for initial assignment to AMPHIBS and CRUDES ships. Once again the coefficient on BLACK is negative, but statistically insignificant, which perhaps results from negative correlation with the Navy experience variables discussed above.

TABLE 15.--PROMOTION BOARD PERFORMANCE MODEL WITH PRECOMISSIONING AND NAVY EXPERIENCE VARIABLES.

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: **PROMOTION BOARD PERFORMANCE**

1605 OBSERVATIONS
302 BPERF = 0
1303 BPERF = 1
0 OBSERVATIONS DELETED DUE TO MISSING VALUES

CONVERGENCE IN 6 ITERATIONS WITH 0 STEP HALVINGS R= 0.286.
MODEL CHI-SQUARE= 147.14 WITH 10 D.F. (-2 LOG L.R.) P=0.0.

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P-VALUE
GPA*	.2999	.0819	13.38	.01
USNA	.2929	.2037	2.07	.15
NESEP	-.1207	.2751	0.19	.66
BLACK	-.0707	.2594	0.07	.78
MQC*	.1230	.0570	4.66	.03
LOWOPP	-.1563	.2007	0.61	.43
AMPHIB*	.4202	.1938	4.70	.03
VARIOUS	.2024	.1808	1.25	.26
TLCRUDES*	.9119	.0964	89.33	.00
ROTC	.0750	.1918	0.15	.69

A final model of LCDR selection adds the number of ADQs (Quals) to the logit models; The result are displayed in Table 16. The number of qualifications in Table 16 are positive and significantly related to LCDR selection. Little change in the other explanatory variables is noted.

In summary, getting promoted early or in-zone to LCDR is positively and significantly related to higher undergraduate

grades, more math courses and higher grades in math. The Navy experience variables including initially serving on AMPHIBS and on CRUDES ships are also positive and significantly related to LCDR selection. No statistically significant difference in LCDR selection is found among accession sources and between White and Black officers.

TABLE 16.--PROMOTION BOARD PERFORMANCE WITH PRECOMISSIONING, NAVY EXPERIENCE AND QUALS VARIABLES

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: **PROMOTION BOARD PERFORMANCE**

1605 OBSERVATIONS
302 BPERF = 0
1303 BPERF = 1

CONVERGENCE IN 6 ITERATIONS WITH 0 STEP HALVINGS R= 0.340.
MODEL CHI-SQUARE= 201.82 WITH 11 D.F. (-2 LOG L.R.) P=0.0.

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P-VALUE
GPA*	.2555	.0841	9.22	.00
USNA	.2469	.2081	1.41	.23
NESEP	.1062	.2805	0.14	.70
BLACK	-.0169	.2639	0.00	.94
MQC*	.1051	.0578	3.31	.06
LOWOPP*	-.0532	.2067	0.07	.79
AMPHIB*	.3910	.1973	3.93	.04
VARIOUS	.1406	.1851	0.58	.44
QUALS*	.4078	.0587	48.15	.00
TLCRUDES*	.7406	.0977	57.41	.00
ROTC	.1120	.1950	0.33	.56

Once again the pearson correlation coefficients are computed and shown in Table 17. These crrelations provide additional relationships and further confirm the performance of all variables in the explanations of promotion board performance.

TABLE 17.--PEARSON CORRELATION COEFFICIENTS: DEPENDENT VARIABLE, PERFORMANCE

	PERFORM	GPA	USNA	NESEP	BLACK	MAJOR	MQC	TQC	LOWOPP	AMPHIB	VARIOUS	TLCRUDES	TLGBIL
PERFORM	1.0												
GPA	.10	1.0											
USNA	.06	-.03	1.0										
NESEP	-.02	-.01	-.17	1.0									
BLACK	-.04	-.12	.04	-.02	1.0								
MAJOR	.03	-.01	.11	.27	-.01	1.0							
MQC	.08	.11	.33	.22	-.02	.53	1.0						
TQC	.05	.17	.27	.30	-.04	.62	.61	1.0					
LOWOPP	-.03	-.04	.03	-.03	.07	-.02	-.04	-.01	1.0				
AMPHIB	-.06	-.17	-.03	.05	-.01	-.02	-.06	-.07	.04	1.0			
VARIOUS	-.06	-.06	-.01	-.01	-.01	-.01	-.03	-.01	.02	-.22	1.0		
TLCRUDES	.26	.06	.02	-.07	-.06	-.05	-.01	-.04	-.02	-.32	-.24	1.0	
ROTC	.01	-.01	-.33	-.16	-.01	.12	.17	-.14	-.01	-.01	.05	-.01	1.0

To better understand the relationship between initial billet, initial ship type, the number of qualifications earned, Navy experience variables, and promotion outcome additional two-way cross tabulations are given and summarized

in Table 18. First it is clear that better initial billets (HIOPP) are positively related to LCDR promotion board outcomes; however, the chi-square statistic indicates the relationship is not significant.

TABLE 18.--SELECTION BOARD PERFORMANCE BY BILLETS, SHIP TYPE, AND AQDs

BILLET TYPE	DEEP	ZONE	PASS
HIOPP	3.5%	74.4%	22.1%
LOWOPP	2.5%	72.1%	25.5%

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	2	1.689	0.430

SHIP TYPE	DEEP	ZONE	PASS
AMPHIB	1.9%	69.6%	28.4%
CRUDES	4.5%	77.4%	18.2%
VARIOUS	1.9%	69.2%	28.8%
SHORE	0.0%	69.5%	30.5%

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	6	36.731	0.000

No. of ADQs	DEEP	ZONE	PASS
1	8.3%	11.9%	29.1%
2	20.0%	25.3%	22.6%
3	31.7%	27.3%	15.1%
4	21.7%	18.7%	7.3%
5	8.3%	8.2%	4.0%
6	8.3%	5.7%	1.0%
7	1.7%	2.7%	0.0%

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	14	371.909	0.000

Second, time at sea by various ship type is also related to officer selection to LCDR. Far greater percentages of deep selected officers served on CRUDES ships (4.5 percent) and far fewer are passed over (18.2 percent). The chi-square statistic (36.73/0.000) is significant, suggesting some part of the LCDR promotion board performance can be explained by ship type.

Third, the number of ADQs is positively related to LCDR selection. For example, officers acquiring four or more ADQs are far more likely to be deep selected (40.0 percent) and far less likely to be passed over (12.3 percent). The chi-square statistic (371.91/0.000) is again significant and indicates officers who gain fewer qualifications are not as likely to be promoted deep or in zone.

Table 19 seperates promotion performance by race. Black officers are less likely to be deep selected compared to White officers (2.7 percent versus 3.4 percent) and more likely to passed over (29.1 percent versus 21.7 percent).

TABLE 19.--SELECTION BOARD PERFORMANCE BY RACE

SELECTION	BLACK	OTHER	WHITE
DEEP	2.7%	2.7%	3.4%
ZONE	68.2%	62.6%	74.8%
PASS	29.1%	35.1%	21.7%

STATISTICS FOR TABLE OF XRACE BY CAT

STATISTIC	DF	VALUE	PROB
LIKELIHOOD RATIO CHI-SQUARE	4	6.229	0.183

The chi-square (6.229/0.183) is insignificant, as expected, due to the strong correlations of race with billet, ship types, and ADQs as addressed above.

In summary, undergraduate grades and math curriculum are found to be related to LCDR performance while commissioning source is not significantly related to performance. Most Navy experience variables are significantly related to officer performance; serving on Crudes and Amphibs is positively related to performance when compare to serving in shore billets. Additional ADQs are also positively related to LCDR promotion board performance. After controlling for pre-commissioning factors and Navy experience variables race has little, if any direct impact on officer performance. Intermediate analysis of initial billet, ship type and ADQs suggest that there is an indirect relationship between race and performance. In particular, Black officers are less likely to be assigned to CRUDES ships initially and later are

less likely to acquire additional qualifications. These later factors are found to be significantly related to LCDR officer selection board performance, which may account for the coefficient of the BLACK variable being negatively but insignificantly related to LCDR performance.

V. SUMMARY AND RECOMMENDATIONS

A. SUMMARY

This research has examined the relationship between initial billeting, ship assignment, and the number of surface qualifications earned and surface warfare officers' performance at the lieutenant commander selection boards. The major findings of the study are as follows:

- Initial ship assignments on CRUDES and amphibious platforms increase the likelihood of acquiring additional qualifications and of later of being promoted to LCDR.
- Initial assignments to "good" billets increase the likelihood of acquiring additional qualifications, but are not significantly related to LCDR performance.
- Undergraduate grade point average and mathematics curriculum increase the likelihood of getting initial CRUDES and amphibious ship assignments, acquiring additional qualifications and of being promoted to LCDR.
- Accession source is not significantly related to acquiring additional qualifications or being promoted to LCDR.
- The effect of race on LCDR promotion is a complex relationship involving initial assignments and later qualifications. Black officers are less likely to be assigned to good billets initially, which, in turn, reduces the number of additional qualifications earned. Fewer additional qualifications reduces the chance of being promoted to LCDR. Only through indirect channels are Black officers' chances for promotion affected. These models suggest that initial ship assignments (and not billet type) are the most critical variables in a young Black surface warfare officer's career.

B. RECOMMENDATIONS

This thesis examines a continuing adverse trend regarding the promotion performance of minority officers. Follow-on studies using a similar methodology, but over sampling Blacks and controlling for precommissioning education factors, may increase our understanding of the effects that variables like education and initial ship type and billet assignments have on minority officers. Early evidence in the thesis shows many minority officers with substandard educations begin their careers at a disadvantage so great that they fail to close the gap between themselves and their better-educated counterparts regardless of ship type, billet, experience factors. For others, being assigned to good billets initially helps reduce the gap and increases the likelihood that minority officers will be promoted at rates similar to White officers.

It is noted that far more than a fair share of minority SWOs (8.2 percent versus 2.7 percent and 3 percent for others and whites, respectively) are assigned to shore billets for their initial tour. Is this because they request those assignments that give all other SWOs a running head start for career progression? Are they being assigned to those billets because of low class standing? The data sets analyzed in this thesis provide initial evidence that minorities are assigned to those billets more than their academic background would dictate.

Further studies on SWOs, concentrating on one commissioning source at a time and controlling for precommissioning and demographic factors, would permit more precise discernment of how different communities fare on surface warfare promotion boards. Additionally a study that controls for a particular ship type over a period of time would also solidify the results found here.

APPENDIX A

This thesis focuses solely on the SWO, therefore, the study began by deleting all officers other than SWOs from the lieutenant background files (31,687 records) to create a new file called lieutenant SWO background (LTSWOBCK), containing 5,957 records. This is accomplished by deleting all designators other than 1110, 1115, 1160, and 1165.

Next, lieutenant SWOs are matched with the corresponding records in the LOSS data file (20,392 records) to provide pertinent information concerning reasons for separation, which result in a new file called lieutenant SWO Loss (LTSWOLOSS), containing 3,386 records. This is accomplished by matching LTSWOBCK and the LOSS files.

Some leaver patterns and behaviors are hypothesized as being close to that of stayers because they leave involuntarily and are assumed to have stayed to the next selection board. In order to analyze these involuntary leavers, along with those who remain on active duty, the LTSWOLOSS file is split into two separate files of voluntary leavers, and those forced out for poor performance (LTSWOVOL). The LTSWOVOL file contains 2,793 records, and the involuntary leavers (LTSWOINV) 519 records. The voluntary leavers are isolated from involuntary leavers using the separation code variables, and NAVMILPERSCOMINST 1900.1B, Codes for

Separation. The separation codes which are used, and their descriptions, are presented in Appendix B.

The next step is to create a file, which represents those officers who did not leave the naval service, but who change designators. This file is labeled 0304MVO and contains 678 records. This is accomplished by matching the LTSWOBCK file with LCDNONBK, which will be described later.

To create a final file of SWO leavers (LTLVSWO), containing 471 records, the LTSWOVOL file created earlier and the 0304MVO file are merged together.

To continue the focus on SWOs, officers of other specialties have to be separated from the lieutenant commander background file (15,624 records) to create a lieutenant commander SWO background file (LCSWOBCK) containing 2,079 records, and a non-SWO lieutenant commander file (LCDNONBK), containing 13,545 records. This is accomplished by separating all other designators from 1110, 1115, 1160, and 1165.

To create the final file of SWO officers who stay in the Navy (SWOSTAY), containing 6,644 records, the LTSWOBCK file and the LCSWOBCK files are merged to create the file (0304SWO), containing 6,125 records. This file is then merged with the LTSWOINV file created earlier.

The final step in organizing the data is achieved by matching the records in each file against the experience files to include crucial information on the officer's previous assignments. The LTLVSWO and SWOSTAY files are matched

against both the lieutenant (22,376 records) and lieutenant commander (15,624 records) experience files. This process creates the files "leavers-experience" (LVREXP), containing 3,290 records, and "stayers-experience" (STAYEXP), containing 6,157 records. These files represent the main data files which are used in this thesis. A visual representation of the creation process used to create both files is illustrated in Figure 2.

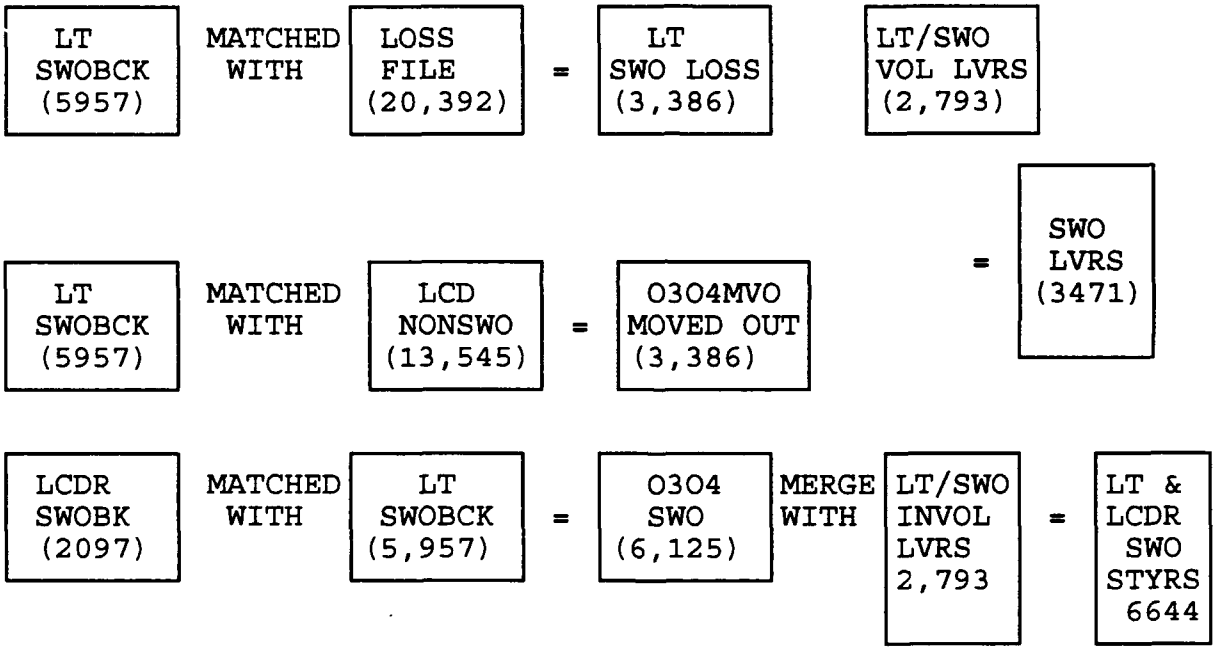

Figure 3.--File Creation Process Flow Chart

The program used to derive the separate files are presented in Appendix C. The variable layouts of the

background, experience and loss files (used to create both LEAVREX and STAYREX) are presented in Appendices C and D.

APPENDIX B

TYPE OF SEPARATION

1. RESIGNATION (IN LIEU OF FURTHER BOARD ACTION)
2. RESIGNATION (IN LIEU OF COURT MARTIAL)
3. OTHER
4. INVOLUNTARY DISCHARGE (BOARD ACTION)
5. INVOLUNTARY DISCHARGE - IN LIEU OF FURTHER PROCEEDINGS OR BOARD ACTION
6. INVOLUNTARY DISCHARGE
7. INVOLUNTARY RELEASE OR TRANSFER
8. VOLUNTARY RELEASE OR TRANSFER
9. DROPPED FROM THE ROLLS
10. VACATION OF APPOINTMENT
11. VOLUNTARY RETIREMENT
12. MANDATORY RETIREMENT

STAYERS and INVOLUNTARY LEAVERS

BHK 1 - Substandard Performance

BKC Not Specified

BKK 1 - Misconduct - Drug abuse

BKN 1 - Misconduct - Pattern of minor disciplinary infractions

BMF Not Specified

BPB Not Specified

DDD Not Specified

DKG 2 - Misconduct - Fraudulent entry

DKK 2 - Misconduct - Drug abuse

DKQ 2 - Misconduct - Commission of a serious offense

DNB 2 - Malfeasance

VOLUNTARY LEAVERS

FBK 3 - Completion of required service

FCF 3 - Attend school

FKC

MBK 8 - Completion of required active service

MDB 8 - Hardship

MFF

MGJ

MGP

MND 8 - Miscellaneous individual

ELIMINATED

RBC

RBD 11 - 20 or more years active service

SFJ 12 - Disability, permanent

SFK 12 - Disability, temporary

XXX

ZZZ

899

APPENDIX C

NAVY OFFICER BACKGROUND DATA FILE LAYOUT

POS	CODE	DESCRIPTIONS
1-9	SSN	SOCIAL SECURITY NUMBER
10-11	COMYR	COMMISSIONING YEAR
12-15	DESIG	COMMUNITY DESIGNATOR
16	SOURCE	ACCESSION SOURCE (1=USNA; 2=ROTC-R; 3=NESEP- OCS; 4=OCS & ROTC-C)
17-20*	SBGRD	SELECTION BOARD GRADE (LT; LCDR; ETC)
21-22	FYSB	FISCAL YEAR OF SELECTION BOARD
23	PERF	SELECTION BOARD PERFORMANCE (1=EARLY SELECT; 2=IN ZONE SELECT; 3=IN ZONE PASS; 4=IN ZONE PASS; 4=LATE SELECT; 5=LATE PASS)
24-25	AGE	AGE AT COMMISSIONING DATE
26*	RACE	ETHNIC CODE ('C'=WHITE; 'N'=BLACK; 'X'=OTHER)
27	SEX	GENDER CODE (0=MALE; 1=FEMALE)
28	DEPS	MARITAL STATUS (0=0 DEPENDENTS; 1=MARR'D-0 CHILDREN; 2=MARR'D-1 CHILD; 3=MARR'D-2+CHILD; 4=DIVORCED/SEPARATED-1+CHILD)
29	MSPSE	MILITARY SPOUSE (0=NO; 1=FEMALE)
30-39*	UGSCH	UNDERGRADUATE COLLEGE NAME
40	UGSEL	UNDERGRAD SCHOOL SELECTIVITY INDEX (BARRON'S)

41	UGMAJ	UNDERGRAD MAJOR CODE (1=ENGINEERING; 2=MATH, COMPTR SCO, OPS ANALYSIS; 3=NATURAL BIOLOGICAL SCIENCES; 4=SOCIAL SCIENCES; 5=ARTS, HUMANITIES, COMMUNICATIONS; 6=MANAGEMENT/ECONOMICS; 7=EDUCATION, LIBRARY SCIENCE, PHYS ED, ETC.)
42	GPA	UNDERGRADUATE GRADE POINT AVERAGE (1=0-1.89; 2=1.9-2.19; 3=2.2-2.59; 4=2.6-3.19; 5=3.2-3.59; 6=3.6-4.0)
43	MQC	MATH QUALIFICATION CODE (1=0 MATH C; 2=1+PRE-CALC; 3=2+PRE-CALC B; 4=1 CALC C; 5=2+CALC C+; 6=2+CALC B+; 7=SIG POST-CAL B)
44	TQC	TECHNICAL QUALIFICATION CODE (1=0 PHYSICS; 2=1+ PHYS C; 3=PHYS SEQUENCE C+; 4=PHYS SEQ B+; 5=UP DIVISION ENG/PHYS SCI MAJOR C+; 6=UP DIVISION ENG/PHYS SCI MAJOR B+)
45	MASTR	MASTERS DEGREE (0=NO; 1=YES)
46	NPS	NAVAL POSTGRADUATE SCHOOL DEGREE (0=NO;1=YES)
47	GSMAJ	GRADUATE SCHOOL MAJOR (SEE UGMAJ LISTING)
48-49	MAJOR1	UNDERGRAD MAJOR NUMBER (SEE NOBC MANUAL)
50-51	MAJOR2	GRAD SCHOOL MAJOR NUMBER (SEE NOBC MANUAL)
52-61	GSNAME	GRADUATE SCHOOL NAME
62	GSSEL	GRAD SCHOOL SELECTIVITY CODE (BARRON'S)

63-66	PDES	PRIOR COMMUNITY DESIGNATOR
67-70	YRSLT	YEARS TO GRADE
71-72	MSRYR	MS REQUIREMENT YEARS
73-74	PRIOR	PRIOR SERVICE
75-76	COMON	CURRENT COMMUNITY GROUP
76-77	GSYR	YEAR ATTENDED GRAD SCHOOL
78*	NOGRD	NOT DESIRE EDUCATION ('X'=TRUE)
79*	EDPC	EDUCATION PROGRAM CODE
80*	EDSS	EDUCATION SELECTEE STATUS

APPENDIX D

NAVY OFFICER EXPERIENCE DATA FILE LAYOUT

POS	CODE	DESCRIPTIONS
1-9	SSN	SOCIAL SECURITY NUMBER
10-13	DESIG	COMMUNITY DESIGNATOR
14-18*	CMDSCR	SCREEN FOR COMMAND
19-21	SS1	SERVIC SCHOOL: #1 (MOST RECENT)
22-24	SS2	SERVIC SCHOOL: #2
25-27	SS3	SERVIC SCHOOL: #3
28-30	SS4	SERVIC SCHOOL: #4
31-33	SS5	SERVIC SCHOOL: #5
34-37	NOBC1	NAVY OFFICER BILLET CODE: #1 (MOST RECENT)
38-41	NOBC2	NAVY OFFICER BILLET CODE: #2
42-45	NOBC3	NAVY OFFICER BILLET CODE: #3
46-49	NOBC4	NAVY OFFICER BILLET CODE: #4
50-53	NOBC5	NAVY OFFICER BILLET CODE: #5
54-57	NOBC6	NAVY OFFICER BILLET CODE: #6
58-61	NOBC7	NAVY OFFICER BILLET CODE: #7
62-77*	DSTN1	DUTY STATION: #1 (MOST RECENT)
78-93*	DSTN2	DUTY STATION: #2
94-109*	DSTN3	DUTY STATION: #3
110-125*	DSTN4	DUTY STATION: #4
126-141*	DSTN5	DUTY STATION: #5

142-144*	AQD1	ADDITIONAL QUALIFICATION DESIGNATOR: #1 (MOSTRECENT)
145-147*	AQD2	ADDITIONAL QUALIFICATION DESIGNATOR: #2
148-150*	AQD3	ADDITIONAL QUALIFICATION DESIGNATOR: #3
151-153*	AQD4	ADDITIONAL QUALIFICATION DESIGNATOR: #4
154-156*	AQD5	ADDITIONAL QUALIFICATION DESIGNATOR: #5
157-159*	AQD6	ADDITIONAL QUALIFICATION DESIGNATOR: #6
160-162*	AQD7	ADDITIONAL QUALIFICATION DESIGNATOR: #7
163-166	NUKCD	NUCLEAR POWER COMMISSIONING DATE (Y/M)
167-170	SUBQD	SUBMARINE QUALIFICATION DATE (Y/M)
171-174	AVNCD	AVIATION COMMISSIONING DATE (Y/M)
175-178	PLTQD	PILOT QUALIFICATION DATE (Y/M)
179-182	NFOQD	NFO QUALIFICATION DATE (Y/M)
183-184	FYSEL	FISCAL YEAR OF SELECTION BOARD (19XX)
185-188*	GRDSEL	GRADE OF SELECTION BOARD

APPENDIX E

NAVY OFFICER LOSS DATA FILE LAYOUT

POS	CODE	DESCRIPTIONS
1-9	SSN	SOCIAL SECURITY NUMBER
10-11	GRADE	GRAD AT SEPARATION (20=UNKNOWN; 21=ENS; 22=LTJG; 23=LT; 24=LCDR; 25=CDR; 26=CAPT; 27-31=?)
12-15	DESIG	COMMUNITY DESIGNATOR
16-18*	SPD	SEPARATION PROGRAM DESIGNATOR (SEE MANUAL)
19-20	ISC	INTER-SERVICE SEPARATION CODE (SEE MANUAL)
21-24	DSEP	DATE OF SEPARATION (Y/M)
25	ARES	ACTIVE-RESERVE STATUS AT SEPARATION (0=UNKNOWN; 1=REGULAR; 2=TEMPORARY; 3=RESERVE; 4=NATIONAL GUARD; 5=SPCL RESERVE)

APPENDIX F

SHIP TYPES

BATTLESHIPS

BB Battleships (2)

Cruisers
CGN Guided Missile Cruisers (9)
(nuclear-powered)
CG Guided Missile Cruisers (37)

Destroyers
DDG Guided Missile Destoyers (18)
DD Destroyers (31)

Frigates
FFG Guided Missile Frigates (35)
FF Frigates (34)

Light Forces
PHM Guided Missile Patrol Combatants (6)
PBC Coastal Patrol Craft (-)

Amphibious Warfare Ships
LCC Amphibious Command Ships (2)
LHA Amphibious Assualt Ships (5)
(general purpose)
LHD Amphibious Assault ships (1)
(multi-purpose)
LKA Amphibious Cargo ships (5)
LPD Amphibious Transport docks (13)
LPH Amphibious Assault ships (7)
(helicopter)
LSD Dock Landing Ships (12)
LST Tank Landing Ships (17)

Mine Warfare Ships
MCM Mine Countermeasures Ships (7)
MSO minesweepers (2)
(ocean)
MHC Minehunters (-)
(coastal)

Auxiliary Ships
AGF Miscellaneous Command Ships (2)
AGES Auxillary Research Submarine (1)
AE Ammunition Ships (12)
AFS Combat Stores Ships (7)
AD Destroyer Tenders (9)
AO Oilers (5)
AOE Fast Combat Support Ships (4)
AOR Replenishment Oilers (7)
AR Repair Ships (2)
ARL Repair Ship Small (1)
ARS Salvage Ships (8)
AS Submarine Tenders (12)
ASR Submarine Rescue Ships (6)
ATS Salvage and Rescue Ships (3)
AVT Training Carrier (1)
ATF Fleet Tugs (2)

NAVAL RESERVE FORCE
FF Frigates (12)
FFG Guided Missile Frigates (16)
LST Tank Landing Ships (3)
MSO Minesweepers (ocean) (14)
ARS Salvage Ships (3)

MILITARY SEALIFT COMMAND INVENTORY

STRATEGIC SEALIFT (Active)

Ocean Transportation Ships
TAO Oilers, Tankers (24)
(TAOT)
TAK Freighters, Ro/Ro, Combination (21)
(TAKR)

Prepositioning Ships
TAK/TAKB/TAKF Cargo Ships (8)
TAOT Tankers (4)
TAK Maritime Prepositioning Ships (MPS) (13)

Naval Fleet Auxiliary Force
TAO Oilers (18)
TAFS Combat Stores Ships (3)
TATF Fleet Ocean Tugs (7)
TAGOS Ocean Surveillance Ships (19)
TAK-FBM Fleet Ballistic Missile Ships (2)
TAF Fleet Stores Ship (1)
TAE Ammunition Ship (1)

STRATEGIC SEALIFT (Reserve)

Fast Sealift Ships
TAKR Fast Sealift Ships (MPS) (8)

Aviation Support Ships
TAVB Aviation Support Ships (MPS) (2)

Hospital Ships (2)
TAH Hospital Ships (2)

Ready Reserve Force

TAK,TAKR	Cargo ships (73)
TAK	Seatrain ships (2)
TAOTT	Tankers (8)
TAOG	Gasoline Tankers (3)
TACS	Auxiliary Crane Ships (MPS) (8)
TAP	Troop ship (2)

SPECIAL MISSION SUPPORT SHIPS

TAGFF	Frigate Research Ship (1)
TAGM/TAGDS	Missile Range Instrumentation Ships (4)
TAGOR	Oceanographic Research Ships (6)
TAGS	Surveying Ships (9)
TAG	Navigation Support Ship (1)
TAG	Acoustic Research Ship (1)
TARC/TAK	Cable Repairing Ships (3)

*** The number inside the parentheses represents active units.**

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